CALCULUS 12 LG 12/13

APPLICATIONS OF THE DERIVATIVE

INTRODUCTION:

In this learning guide we will study various applications of the derivative. For example, we will investigate problems concerned with finding the "best" way to perform a task. In addition, we will use the derivative to study the motion of a particle along a line.

LEARNING GUIDE EXPECTATIONS:

On the completion of this learning guide you will be able to:

1) Determine absolute extrema of functions on open and closed intervals.
2) Solve optimization problems.
3) Solve problems involving distance, velocity, and acceleration.
4) Use Newton's formula (with technology) to find the solution of given equations, $f(x) = 0$.

EVALUATION:

When you are ready, write the LG 12/13 quiz in the test centre.

RESOURCES NEEDED:

Calculus 12 text.

www.thssmath.com

LEARNING ACTIVITIES

Expectation #1: Determine absolute extrema of functions on open and closed intervals.

1. Watch and take notes on instructional video on Absolute Extrema.
2. In Chapter 6.1, read pages 330-top of page 336 (ignore the part on "Absolute Extrema and Parametric Curves".

3. In your journal,

I. Explain in your own words the Extreme Value Theorem.

II. Explain how to find the absolute extrema on a closed interval.

4. On pages 337-338, complete questions #3, 5-33, 37.

Expectation #2: Solve optimization problems.

1. Watch and take notes on instructional video on Applied Max-Min Problems.

2. In Chapter 6.2, read pages 339-347.

3. In your journal, include the 5 step procedure that can be used to solve applied max and min problems. Use your own words so it makes sense to you.

4. On pages 348-349, complete questions #1, 3-6, 9, 11, 15, 17, 19, 23, 25, 33, 41, 45, 51.

Expectation #3: Solve problems involving distance, velocity and acceleration.

1. Watch and take notes on instructional video on Distance, Velocity and Acceleration.

2. In Chapter 6.3, read pages 352-359.

3. In your journal,

I. Explain how you can find a velocity and acceleration function from a distance function.

II. Explain how you can determine when a particle is speeding up or slowing down.

4. On pages 359-361, complete questions #1-3, 5, 11-23, 25, 27.

Expectation #4: Use Newton's formula (with technology) to find solutions of given equations, $f(x) = 0$.

1. Watch and take notes on instructional video on Newton's Method.

2. In Chapter 6.4, read pages 363-366.

3. In your journal, describe using an example, how to approximate the zeros of a function using Newton's Method.

4. On pages 366-367, complete questions #1-23, 27.